

## Recent Introductions for Biological Control in Hawaii XVI

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For many years the Entomology Branch of the Hawaii Department of Agriculture has maintained a continuous program of beneficial introductions. This paper, therefore, includes a list of new introductions and additional releases for biological control in Hawaii (Table 1) made since the last listing (Davis 1969) and gives a few notes on the status of pests and their purposely introduced enemies.

### SNAIL PEST CONTROL

#### **Achatina fulica** Bowdich (giant African snail)

Infestations of the giant African snail remained localized at Kona, Hawaii and at Poipu and Wahiawa, Kauai. Ground applications of metaldehyde pellets continued throughout the year and may have contributed to a population reduction in two of the three aforementioned localities. No live snails were found at Nawiliwili, Kauai throughout the year and the prospects of eradication are promising.

The introduced predator, *Gonaxis quadrilateralis* (Preston) was found in large numbers near the Kapaa Quarry dump site, Kawainui, Oahu, an area formerly dense with *Achatina*. Predation in the egg clutches and on *Achatina* up to 35 mm in size during early morning hours was readily observed. The predaceous flatworm, *Geoplana septemlineata* Hyman, was not found but could have been responsible for some *Achatina* predation, especially in the 75–100 mm size range. Replacement populations for *Gonaxis* were obvious and minimal for *Achatina*.

In the Koolau mountain range on Oahu *Euglandina rosea* (Ferussac) remained at trace levels, with hundreds of its empty shells of all age levels noted at Pupukea, Waikane, and Tantalus. The population decline of *Euglandina* in the Koolau mountain range may be due to the flatworm, *G. septemlineata*. In the meantime, studies on the behavior of *Euglandina* in mountain forest areas are continuing. It was not found in the Waianae mountain range in 1970 (Honouliuli and Mokuleia Forest Reserves) and the large number of empty Achatinellid shells in the various gulches cannot be attributed to this carnivorous snail.

#### **Galba** (= **Lymnaea**) **viridis** (Quoy and Gaimard) (liverfluke snail)

The introduced sciomyzid, *Sepedon sauteri* Hendel from Fukuoka, Japan continued to spread throughout the State despite egg parasitism

by *Trichogramma* sp., probably *japonicum* Ashmead. The latter was introduced many years ago from Japan for biological control of the rice borer, *Chilo suppressalis* (Walker).

*S. sauteri* appears to have replaced *S. macropus* Walker in some aquatic habitats and also occurs in some habitats presently unoccupied by the latter. Additional introduced sciomyzid species are shown in Table 1 and thus far have not been recovered or become established in the State.

#### WEED PEST CONTROL

##### **Lantana camara** var. **aculeata** (L.) Moldenke (lantana)

Lantana was heavily defoliated for many months in North Kona, Hawaii particularly in the vicinity of Puuanahulu by the noctuid, *Hypena strigata* (Fabricius) and the tingid, *Teleonemia scrupulosa* Stål. In Central Kona, damaging population levels were attained by the chrysomelid, *Octotoma scabripennis* Guerin-Meneville in October while the hispid, *Uroplata girardi* Pic, attained damaging levels between June and October in the vicinity of Kukui Paddock, Ka'u.

A population explosion of the introduced stick caterpillar, *Catabena esula* Druce, caused spectacular defoliation of lantana plants scattered over 1,000 acres at South Point, Ka'u in September and October and as many as 30 cocoons were counted on individual plants.

Thus, after several years of quiescence, introduced lantana insects have seemingly responded to favorable factors and attained damaging levels over wide areas on the Island of Hawaii.

##### **Hypericum perforatum** L. (Klamath weed)

In Occasional Papers XXIV, 2, 1969 "Notes on Hawaiian Plants" by Fosberg published by the Bishop Museum, the author records klamath weed at Kaupulehu Road, Mt. Hualalai, 1,500 m on 9 September 1961. This updates a previous report of 6 July 1964 by Norman Carlson; also reported in Proc. Haw. Ent. Soc. Vol 19 (2): 205.

On 5 May 1967 Mr. E. Lake collected a single ♀ *Chrysolina* specimen in the Volcano District, Island of Hawaii. This was the first record of this beetle in this locality and was approximately 50 or 60 miles from the 1965 release point on Mt. Hualalai. *H. perforatum* is not known to occur in the Volcano area.

On 16 September 1970 *Chrysolina* beetles were found on *Hypericum degeneri* Fosberg, a new host record at a sawmill site near the Puu Oo trail, Kilauea Forest Reserve, 1,676 m and subsequently at the University of Hawaii Agricultural Experiment Station, 1,372 m, Wright Road, Volcano District in October, 1970. These beetles were determined by Dr. Richard E. White, as *Chrysolina hyperici* (Forster). Eggs were readily found on *H. degeneri* during September and October but larvae and pupae were much less abundant.

TABLE 1. *New Introductions and Additional Releases for Biological Control in Hawaii 1970*

<i>Pest Needing Control</i>	<i>Organism Introduced</i>	<i>No.</i>	<i>Source</i>	<i>Collector</i>	<i>Date Rel'd</i>	<i>No. Rel'd**</i>	<i>Release Point</i>
					1970		
<i>Snail Pests</i>							
<i>Galba</i> (= <i>Lymnaea</i> ) <i>viridis</i> (Quoy & Gaimard)	<i>Sepedon praemiosa</i> Giglio-Tos (Diptera: Sciomyzidae)	60 pupae	Riverside, Calif.	Dr. T. Fisher	Sept.	23	Waihee, Maui
	* <i>Sepedon pacifica</i> Cresson (Diptera: Sciomyzidae)	20 pupae 24 adults	Riverside, Calif.	R. Suzukawa	Nov.	475	Waihee, Maui
	<i>Dictya texensis</i> Curran (Diptera: Sciomyzidae)	89 pupae 15 adults	Riverside, Calif.	R. Suzukawa			Approved for release. Liberation pending.
<i>Weed Pests</i>							
<i>Lantana camara</i> var. <i>aculeata</i> Moldenke (lantana)	<i>Leptobyrsa decora</i> Drake (Hemiptera: Tingidae)	200 adults	Brisbane, Australia	Dr. K. L. S. Harley	Mar. 19 Aug. 12 May 25	350 593 300	Keokea, Maui Ulupalakua, Maui Kokee, Kauai
<i>Clidemia hirta</i> (L.) (Kosters Curse)	<i>Blepharomastix ebulealis</i> Guenée (Lepidoptera: Pyralidae)	1 lot caterpillars 1 lot caterpillars	Trinidad, West Indies Santurce, Puerto Rico	C. J. Davis	Dec. 17	41	Wahiawa Forest Reserve, Oahu
<i>Insect Pests</i>							
<i>Aspidiotus destructor</i> Signoret (coconut scale)	<i>Pseudoscyrnus</i> Chapin (Coleoptera: Coccinellidae)	168 adults	Agana, Guam	R. P. Owens	Feb. 4	24	Pearl City Banana Patch, Oahu
Mites, scales and sooty black mold	<i>Saula japonica</i> Gorham (Coleoptera: Endomychidae)	23 adults	Fukuoka, Japan	Prof. K. Yasumatsu	Feb. 2	19	Pahoa, Hawaii
<i>Musca domestica</i> Linnaeus (house fly)	<i>Muscidifurax uniraptor</i> K & L (Hymenoptera: Pteromalidae)	1 lot pupae	Riverside, California	Dr. F. Legner	Apr. 29	60	Ewa, Oahu
<i>Schistocerca vaga</i> (Scudder) (vagrant grasshopper)	<i>Blaesoxipha filipjevi</i> (Rohdendorf) (Diptera: Sarcophagidae)	130 pupae	Uganda, Africa	D. Girling	June	112	Waimanu, Oahu

\*Previously introduced.

\*\*Applies to initial release only.

The gall midge, *Zeuxidiplosis giardi* (Kieffer), although widespread on *H. perforatum* on Mt. Hualalai, was not observed on *H. degeneri* in the Volcano District.

**Clidemia hirta** (L.) (Kosters curse)

Host specificity tests for the pyralid, *Blepharomastix ebulealis* Guenée were completed and it was approved for release in October, 1970. Its liberation is reported in Table 1.

*B. ebulealis* caterpillars were found on *Clidemia* in Trinidad and on a closely allied melastomaceous plant, *Heterotrichum cymosum* in Puerto Rico.

#### INSECT PEST CONTROL

**Rhabdoscelus obscurus** (Boisduval) (New Guinea sugarcane weevil)

Beginning in July 1970, liberation of the Garaina and Wau species of the New Guinea sugarcane weevil parasites, *Lixophaga* spp. was shifted to Hawaii and Maui, respectively. Releases on Kauai were discontinued. This is a cooperative effort between the Experiment Station of the Hawaiian Sugar Planters' Association and this Department.

**Melanagromyza phaseoli** (Tryon) (bean fly)

The two parasites obtained from the Commonwealth Institute of Biological Control Station at Uganda, East Africa for control of *M. phaseoli* were determined by Dr. Fischer as *Opius phaseoli* Fischer and *O. importatus* Fischer. Of the two species, *O. importatus* is well established on Oahu and is becoming well established on Kauai and Maui.

**Pseudaletia unipuncta** (Haworth)

Cocoons of *Apanteles militaris* (Walsh) were found at 1,524 m elevation near the Puu Oo trail, Kilauea Forest Reserve, Hawaii on 27 October 1970 by Fred Bianchi. Since the introduction of this braconid parasite from California in May 1960, there have been no major outbreaks of *P. unipuncta* on Hawaii and the current discovery represents a spread of approximately 70 miles from the closest release point, Parker Ranch.

**Schistocerca vaga** (Scudder) (vagrant grasshopper)

Through the cooperation of the Commonwealth Institute of Biological Control, Kawanda Research Station, East Africa, a well documented parasite, *Blaesoxipha filipjevi* Rohdendorf was imported and released. No recoveries have been made to date.

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